

Self-aligned 2-bit "Double Poly CMP" flash memory cell

This application is a 371 of PCT/IB03/03672 filed  
on 8/18/2002.

ENT  
2/20/07

The present invention relates to a method as defined in the preamble of claim 1. Also, the present invention relates to a Flash memory cell manufactured by means of such a method. Further, the present invention relates to a semiconductor device comprising at least one such Flash memory cell.

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Compact memory cells are believed to be the next step towards higher density Flash memories (non-volatile memory cells, NVM cells). Such compact cells are known from US 5,414,693 (and related US 5,364,806 and US 5,278,439), which describes a self-aligned 10 dual-bit split gate (DSG) FLASH EEPROM cell and a method to manufacture such a cell.

However, such prior art compact cells suffer from the fact that the bit-lines of the Flash memory cells consist of buried (non-silicided) diffusions with relatively high electrical series resistance. To reduce the overall resistance of such bit-lines, the compact cells from the prior art require "strapping" of the bit-lines by a metal line.

15 Moreover, the formation of a buried diffusion in an embedded NVM cell manufacturing process requires an additional process-module. Disadvantageously, such a process module may be difficult to integrate in this embedded NVM cell process, as is known to persons skilled in the art.

A further disadvantage of the compact cells from the prior art is the layout of 20 the control gate lines and select gate lines, relative to the buried bit-lines. The control gate lines run parallel to the bit-lines in a direction perpendicular to the direction of the select gate lines, which adversely influences the addressing scheme of a memory array of such compact cells.

Furthermore, lithographic processing of the compact cells from the prior art is 25 complex due to lithographic processing of the implantation mask that keeps the bit-line diffusion implants out of the region between the two floating gates of a DSG cell. Such processing is difficult due to the local topography. To suppress interference in the resist during the exposure of a mask, usually an organic bottom anti-reflective coating (BARC)